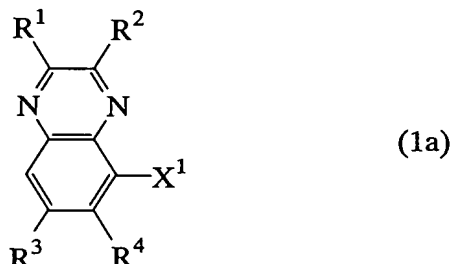


CLAIMS:

1. An aminoquinoxaline compound of the following formula (1a)  
[Chemical Formula 1]



5

wherein R<sup>1</sup> and R<sup>2</sup> independently represent a hydrogen atom, a hydroxyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R<sup>1</sup> and R<sup>2</sup> are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

R<sup>3</sup> and R<sup>4</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R<sup>3</sup> and R<sup>4</sup> are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed

heteroaryl group, these groups may be joined through a single bond;

$X^1$  represents  $-NH-R^5-NH_2$  or  $-NH-R^6$ ;

$R^5$  represents a  $C_1-C_{10}$  alkylene group, a  $-C(O)CH_2-$ ,  
5  $-CH_2C(O)-$ , a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted  
10 with Y, a pyrrole ring which may be substituted with Y, a furan ring which may be substituted with Y, or a condensed hetero ring which may be substituted with Y;

$R^6$  represents a hydrogen atom, a  $C_1-C_{10}$  alkyl group, an acetyl group, a phenyl group which may be substituted with Y,  
15 a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a  
20 condensed heteroaryl group which may be substituted with Y;

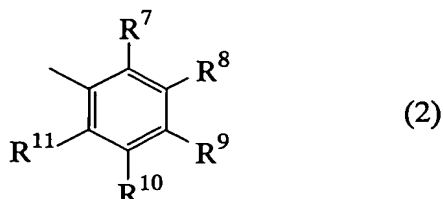
Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1-C_{10}$  alkyl group, a  $C_1-C_{10}$  haloalkyl group, a  $C_1-C_{10}$  alkoxy group, a  $C_1-C_{10}$  cyanoalkyl group, a phenyl group which may be  
25 substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrolyl group which may be substituted with Z, a furyl group which may be  
30 substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1-C_{10}$  alkyl group, a  $C_1-C_{10}$  haloalkyl group, a  $C_1-C_{10}$  alkoxy group, a  
35  $C_1-C_{10}$  cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrolyl group, a furyl

group or a condensed heteroaryl group provided that if Z is two or more in number, Z may be the same or different.

2. The aminoquinoxaline compound according to claim 1,  
5 wherein R<sup>1</sup> and R<sup>2</sup> in the above formula (1) independently represent a group of the following formula (2)

[Chemical Formula 2]

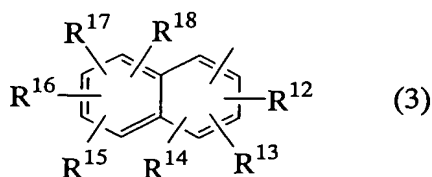


- wherein R<sup>7</sup>-R<sup>11</sup> independently represent a hydrogen atom, a  
10 halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>4</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>4</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl  
15 group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a  
20 naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

3. The aminoquinoxaline compound according to claim 1,  
wherein R<sup>1</sup> and R<sup>2</sup> in the above formula (1) independently  
25 represent a group of the following formula (3)

[Chemical Formula 3]

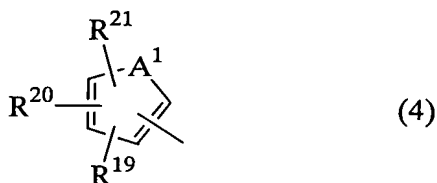


wherein  $R^{12}$ - $R^{18}$  independently represent, each substituted at an arbitrary position on the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  haloalkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a  $C_1$ - $C_{10}$  cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

4. The aminoquinoxaline compound according to claim 1, wherein  $R^1$  and  $R^2$  in the above formula (1) independently represent a group of the following formula (4)

[Chemical Formula 4]



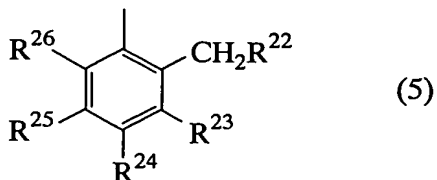
wherein  $R^{19}$ - $R^{21}$  independently represent, each substituted at an arbitrary position on the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z;

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  haloalkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a  $C_1$ - $C_{10}$  cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group; and

$A^1$  represents NH, O or S.

5. The aminoquinoxaline compound according to claim 1, wherein R<sup>1</sup> and R<sup>2</sup> in the above formula (1) represent a group of the following formula (5)

[Chemical Formula 5]

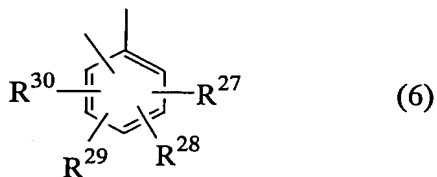


wherein R<sup>22</sup> represents a halogen atom or a cyano group, R<sup>23</sup>-R<sup>26</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

6. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein R<sup>5</sup> in the formula (1) represents a group of the following formula (6)

[Chemical Formula 6]



wherein R<sup>27</sup>-R<sup>30</sup> independently represent, each substituted at an arbitrary position on the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a

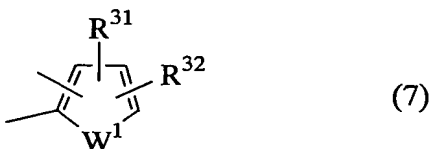
C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

5 Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

10

7. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein R<sup>5</sup> in the formula (1) represents a group of the following formula (7)

[Chemical Formula 7]



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wherein R<sup>31</sup>-R<sup>32</sup> independently represent, each substituted at an arbitrary position on the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z;

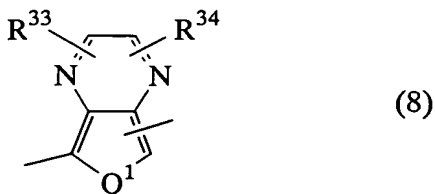
20 Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group; and

W<sup>1</sup> represents NH, O or S.

30

8. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein R<sup>5</sup> in the formula (1) represents a group of the following formula (8)

[Chemical Formula 8]



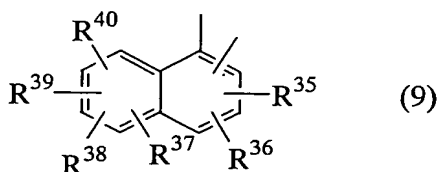
wherein  $R^{33}$ - $R^{34}$  independently represent, each substituted at an arbitrary position on the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z;

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  haloalkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a  $C_1$ - $C_{10}$  cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrolyl group, a furyl group or a condensed heteroaryl group; and

$Q^1$  represents NH, O or S.

9. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein  $R^5$  in the formula (1) represents a group of the following formula (9)

[Chemical Formula 9]

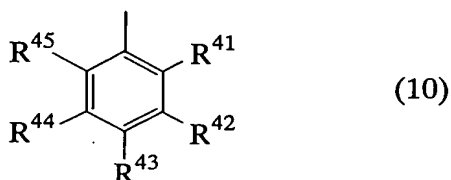


wherein  $R^{35}$ - $R^{40}$  independently represent, each substituted at an arbitrary position on the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

10. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein R<sup>6</sup> in the formula (1) represents a group of the following formula (10)

[Chemical Formula 10]

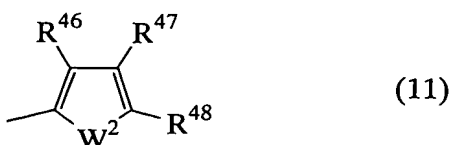


wherein R<sup>41</sup>-R<sup>45</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

11. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein R<sup>6</sup> in the formula (1) represents a group of the following formula (11)

[Chemical Formula 11]





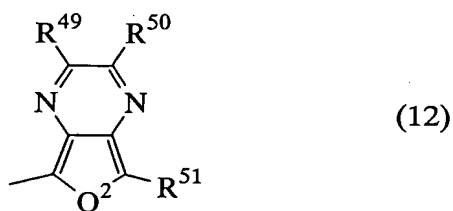
wherein  $R^{46}$ - $R^{48}$  independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z;

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  haloalkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a  $C_1$ - $C_{10}$  cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group; and

$W^2$  represents NH, O or S.

12. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein  $R^6$  in the formula (1) represents a group of the following formula (12)

[Chemical Formula 12]



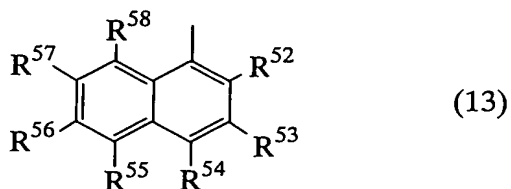
wherein  $R^{49}$ - $R^{51}$  independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z;

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  haloalkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a  $C_1$ - $C_{10}$  cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group; and

$Q^2$  represents NH, O or S.

13. The aminoquinoxaline compound according to any one of claims 1 to 5, wherein R<sup>6</sup> in the formula (1) represents a group of the following formula (13)

[Chemical Formula 13]

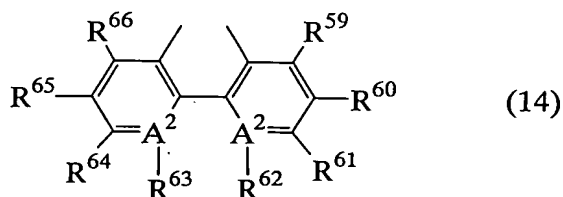


5 wherein R<sup>52</sup>-R<sup>58</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

10 Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

20 14. The aminoquinoxaline compound according to claim 1, wherein the group formed by bonding R<sup>1</sup> and R<sup>2</sup> through a single bond in the formula (1) is represented by the formula (14)

[Chemical Formula 14]



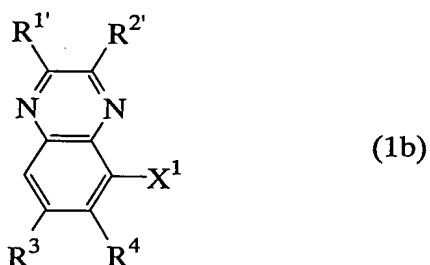
25 wherein A<sup>2</sup> are each CN or N, R<sup>59</sup>-R<sup>66</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be

substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group, provided that when A<sup>2</sup> represents N, R<sup>62</sup> and R<sup>63</sup> are both non-existent.

15. An aminoquinoxaline compound of the following formula (1b),

[Chemical Formula 15]



wherein R<sup>1'</sup> and R<sup>2'</sup> join together to form -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>-, -OCH<sub>2</sub>O-, -CH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>SCH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>N(R')-, -N(R')CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>N(R')CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>O-, -SCH<sub>2</sub>CH<sub>2</sub>S-, -OCH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>O-, -CH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>-, -OCH=CH-, -CH=CHO-, -SCH=CH-, -CH=CHS-, -N(R')CH=CH-, -CH=CHN(R')-, -OCH=N-, -N=CHO-, -SCH=N-, -N=CHS-, -N(R')CH=N-, -N=CHN(R')-, -N(R')N=CH-, -CH=N(R')N-, -CH=CHCH=CH-, -OCH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>O-, -N=CHCH=CH-, -CH=CHCH=N-, -N=CHCH=N-, -N=CHN=CH-, or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl

group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z, or a condensed heteroaryl group which may be substituted with Z;

R<sup>3</sup> and R<sup>4</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R<sup>3</sup> and R<sup>4</sup> are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

X<sup>1</sup> represents -NH-R<sup>5</sup>-NH<sub>2</sub> or -NH-R<sup>6</sup>;

R<sup>5</sup> represents a C<sub>1</sub>-C<sub>10</sub> alkylene group, -C(O)CH<sub>2</sub>-, -CH<sub>2</sub>C(O)-, a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a pyrrole ring which may be substituted with Y a furan ring which may be substituted with Y, or a condensed hetero ring which may be substituted with Y;

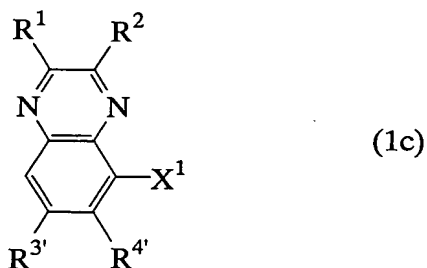
R<sup>6</sup> represents a hydrogen atom, a C<sub>1</sub>-C<sub>10</sub> alkyl group, an acetyl group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y;

Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group, provided that when Z are two or more in number, Z may be the same or different.

16. An aminoquinoxaline compound of the following formula (1c),

[Chemical Formula 16]



wherein R<sup>1</sup> and R<sup>2</sup> independently represent a hydrogen atom, a hydroxyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a

furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R<sup>1</sup> and R<sup>2</sup> are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

R<sup>3</sup> and R<sup>4</sup> join together to form -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>-, -OCH<sub>2</sub>O-, -CH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>SCH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>N(R')-, -N(R')CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>N(R')CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>O-, -SCH<sub>2</sub>CH<sub>2</sub>S-, -OCH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>O-, -CH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>-, -OCH=CH-, -CH=CHO-, -SCH=CH-, -CH=CHS-, -N(R')CH=CH-, -CH=CHN(R')-, -OCH=N-, -N=CHO-, -SCH=N-, -N=CHS-, -N(R')CH=N-, -N=CHN(R')-, -N(R')N=CH-, -CH=N(R')N-, -CH=CHCH=CH-, -OCH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>O-, -N=CHCH=CH-, -CH=CHCH=N-, -N=CHCH=N-, -N=CHN=CH-, or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z, or a condensed heteroaryl group which may be substituted with Z;

X<sup>1</sup> represents -NH-R<sup>5</sup>-NH<sub>2</sub> or -NH-R<sup>6</sup>;

R<sup>5</sup> represents a C<sub>1</sub>-C<sub>10</sub> alkylene group, -C(O)CH<sub>2</sub>-, -CH<sub>2</sub>C(O)-, a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a pyrrole ring which may be substituted with Y, a furan ring which may be substituted with Y, or a condensed hetero ring which may be substituted with Y;

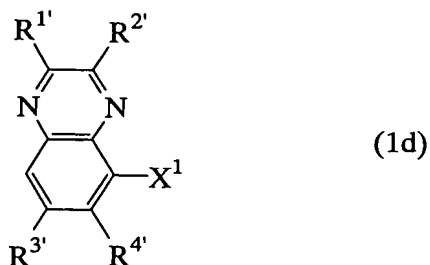
R<sup>6</sup> represents a hydrogen atom, a C<sub>1</sub>-C<sub>10</sub> alkyl group, an acetyl group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y;

Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group, provided that when Z are two or more in number, Z may be the same or different.

17. An aminoquinoxaline compound of the following formula (1d),

[Chemical Formula 17]



wherein R<sup>1'</sup> and R<sup>2'</sup> join together to form -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>O-,  
 -OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>-, -OCH<sub>2</sub>O-, -CH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>SCH<sub>2</sub>-,  
 -CH<sub>2</sub>CH<sub>2</sub>N(R')-, -N(R')CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>N(R')CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-,  
 -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>O-,  
 5 -OCH<sub>2</sub>CH<sub>2</sub>O-, -SCH<sub>2</sub>CH<sub>2</sub>S-, -OCH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>O-, -CH<sub>2</sub>CH=CH-,  
 -CH=CHCH<sub>2</sub>-, -OCH=CH-, -CH=CHO-, -SCH=CH-, -CH=CHS-,  
 -N(R')CH=CH-, -CH=CHN(R')-, -OCH=N-, -N=CHO-, -SCH=N-,  
 -N=CHS-, -N(R')CH=N-, -N=CHN(R')-, -N(R')N=CH-, -CH=N(R')N-,  
 -CH=CHCH=CH-, -OCH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>O-, -N=CHCH=CH-,  
 10 -CH=CHCH=N-, -N=CHCH=N-, -N=CHN=CH-, or -CH=NCH=N- wherein a  
 hydrogen atom bonded to a carbon atom of these groups may be  
 substituted with Y, and R' represents a hydrogen atom, a  
 C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub>  
 cyanoalkyl group, a phenyl group which may be substituted  
 15 with Z, a pyridyl group which may be substituted with Z, a  
 biphenyl group which may be substituted with Z, a naphthyl  
 group which may be substituted with Z, a thienyl group which  
 may be substituted with Z, a pyrrolyl group which may be  
 substituted with Z, a furyl group which may be substituted  
 20 with Z, or a condensed heteroaryl group which may be  
 substituted with Z, and R<sup>3'</sup> and R<sup>4'</sup> join together to form  
 -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>-, -OCH<sub>2</sub>O-, -CH<sub>2</sub>CH<sub>2</sub>S-,  
 -SCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>SCH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>N(R')-, -N(R')CH<sub>2</sub>CH<sub>2</sub>-,  
 -CH<sub>2</sub>N(R')CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-,  
 25 -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>O-, -SCH<sub>2</sub>CH<sub>2</sub>S-,  
 -OCH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>O-, -CH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>-, -OCH=CH-,  
 -CH=CHO-, -SCH=CH-, -CH=CHS-, -N(R')CH=CH-, -CH=CHN(R')-,  
 -OCH=N-, -N=CHO-, -SCH=N-, -N=CHS-, -N(R')CH=N-, -N=CHN(R')-,  
 -N(R')N=CH-, -CH=N(R')N-, -CH=CHCH=CH-, -OCH<sub>2</sub>CH=CH-,  
 30 -CH=CHCH<sub>2</sub>O-, -N=CHCH=CH-, -CH=CHCH=N-, -N=CHCH=N-, -N=CHN=CH-,  
 or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom  
 of these groups may be substituted with Y, and R' represents  
 a hydrogen atom, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group,  
 a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be  
 35 substituted with Z, a pyridyl group which may be substituted  
 with Z, a biphenyl group which may be substituted with Z, a  
 naphthyl group which may be substituted with Z, a thienyl



group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z;

5           X<sup>1</sup> represents -NH-R<sup>5</sup>-NH<sub>2</sub> or -NH-R<sup>6</sup>;

          R<sup>5</sup> represents a C<sub>1</sub>-C<sub>10</sub> alkylene group, -C(O)CH<sub>2</sub>-, -CH<sub>2</sub>C(O)-, a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a pyrrole ring which may be substituted with Y, a furan ring which may be substituted with Y, or a condensed hetero ring which may be substituted with Y;

15           R<sup>6</sup> represents a hydrogen atom, a C<sub>1</sub>-C<sub>10</sub> alkyl group, an acetyl group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y;

          Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different; and

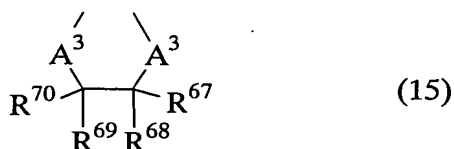
35           Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a

C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group, provided that when Z are two or more in number, Z may be the same or different.

5

18. The aminoquinoxaline compound according to claim 15 or 17, wherein the group formed by joining R<sup>1'</sup> and R<sup>2'</sup> together is of the following formula (15)

[Chemical Formula 18]



10

wherein A<sup>3</sup> represents O or S, and R<sup>67</sup>-R<sup>70</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

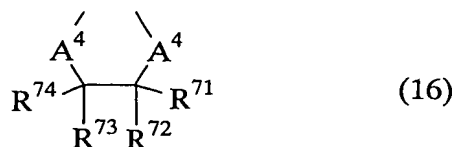
15

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

20

19. The aminoquinoxaline compound according to claim 16 or 17, wherein the group formed by joining R<sup>3'</sup> and R<sup>4'</sup> together is of the following formula (16)

[Chemical Formula 19]



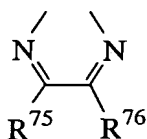
25

wherein A<sup>4</sup> represents O or S, and R<sup>71</sup>-R<sup>74</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

20. The aminoquinoxaline compound according to claim 16 or 17, wherein the group formed by joining R<sup>3'</sup> and R<sup>4'</sup> together is of the following formula (17)

[Chemical Formula 20]



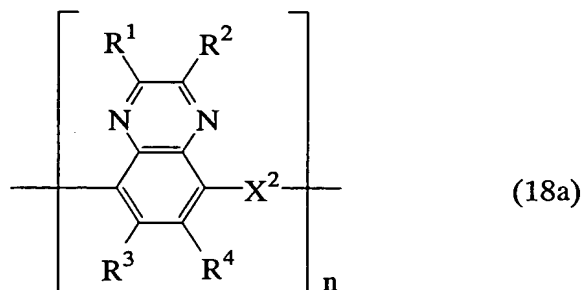
(17)

wherein R<sup>75</sup> and R<sup>76</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

21. A polyaminoquinoxaline compound having recurring units of the following formula (18a) obtained by polymerizing the monomer defined in claim 1,

[Chemical Formula 21]



5

wherein R<sup>1</sup> and R<sup>2</sup> independently represent a hydrogen atom, a hydroxyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R<sup>1</sup> and R<sup>2</sup> are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

R<sup>3</sup> and R<sup>4</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R<sup>3</sup> and R<sup>4</sup> are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed

30

heteroaryl group, these groups may be joined through a single bond;

$X^2$  represents  $-NH-R^{77}-NH-$  or  $-NH-R^{78}-$ ;

$R^{77}$  and  $R^{78}$  independently represent a  $C_1-C_{10}$  alkylene group, a  $-C(O)CH_2-$ ,  $-CH_2C(O)-$ , a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a divalent pyrrole ring which may be substituted with Y, a divalent furan ring which may be substituted with Y or a condensed hetero ring which may be substituted with Y;

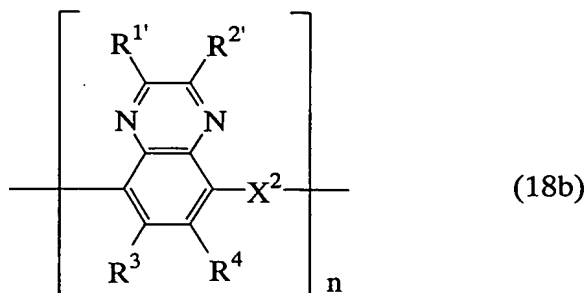
Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1-C_{10}$  alkyl group, a  $C_1-C_{10}$  haloalkyl group, a  $C_1-C_{10}$  alkoxy group, a  $C_1-C_{10}$  cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different;

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1-C_{10}$  alkyl group, a  $C_1-C_{10}$  haloalkyl group, a  $C_1-C_{10}$  alkoxy group, a  $C_1-C_{10}$  cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group provided that if Z is two or more in number, Z may be the same or different; and

n is an integer of 2 or over.

22. A polyaminoquinoxaline compound having recurring units of the following formula (18b) obtained by polymerizing the monomer defined in claim 15,

[Chemical Formula 22]



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wherein R<sup>1'</sup> and R<sup>2'</sup> join together to form -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>-, -OCH<sub>2</sub>O-, -CH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>SCH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>N(R')-, -N(R')CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>N(R')CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>O-, -SCH<sub>2</sub>CH<sub>2</sub>S-, -OCH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>O-, -CH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>-, -OCH=CH-, -CH=CHO-, -SCH=CH-, -CH=CHS-, -N(R')CH=CH-, -CH=CHN(R')-, -OCH=N-, -N=CHO-, -SCH=N-, -N=CHS-, -N(R')CH=N-, -N=CHN(R')-, -N(R')N=CH-, -CH=N(R')N-, -CH=CHCH=CH-, -OCH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>O-, -N=CHCH=CH-, -CH=CHCH=N-, -N=CHCH=N-, -N=CHN=CH-, or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z;

10  
15  
20  
25

R<sup>3</sup> and R<sup>4</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be

30

substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R<sup>3</sup> and R<sup>4</sup> are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

10 X<sup>2</sup> represents -NH-R<sup>77</sup>-NH- or -NH-R<sup>78</sup>-;

R<sup>77</sup> and R<sup>78</sup> independently represent a C<sub>1</sub>-C<sub>10</sub> alkylene group, -C(O)CH<sub>2</sub>-, -CH<sub>2</sub>C(O)-, a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a divalent pyrrole ring which may be substituted with Y, a divalent furan ring which may be substituted with Y, or a condensed hetero ring which may be substituted with Y;

20 Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different;

30 Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl

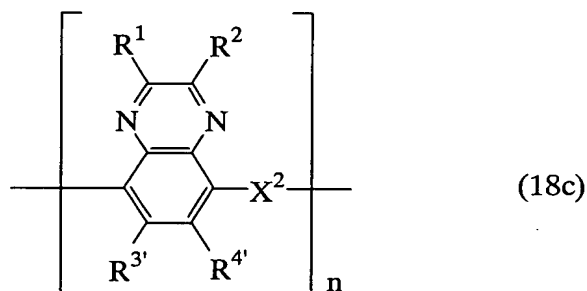
group or a condensed heteroaryl group, provided that when Z are two or more in number, Z may be the same or different; and

n is an integer of 2 or over.

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23. A polyaminoquinoxaline compound having recurring units of the following formula (18c) obtained by polymerizing the monomer defined in claim 16,

[Chemical Formula 23]



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wherein R<sup>1</sup> and R<sup>2</sup> independently represent a hydrogen atom, a hydroxyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R<sup>1</sup> and R<sup>2</sup> are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

R<sup>3'</sup> and R<sup>4'</sup> join together to form -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>SCH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>N(R')-, -N(R')CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>N(R')CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>O-, -SCH<sub>2</sub>CH<sub>2</sub>S-, -OCH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>O-, -CH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>-, -OCH=CH-, -CH=CHO-, -SCH=CH-, -CH=CHS-, -N(R')CH=CH-, -CH=CHN(R')-, -OCH=N-, -N=CHO-, -SCH=N-,



-N=CHS-, -N(R')CH=N-, -N=CHN(R')-, -N(R')N=CH-, -CH=N(R')N-,  
 -CH=CHCH=CH-, -OCH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>O-, -N=CHCH=CH-,  
 -CH=CHCH=N-, -N=CHCH=N-, -N=CHN=CH-, or -CH=NCH=N- wherein a  
 5 hydrogen atom bonded to a carbon atom of these groups may be  
 substituted with Y, and R' represents a hydrogen atom, a  
 C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub>  
 cyanoalkyl group, a phenyl group which may be substituted  
 with Z, a pyridyl group which may be substituted with Z, a  
 biphenyl group which may be substituted with Z, a naphthyl  
 10 group which may be substituted with Z, a thienyl group which  
 may be substituted with Z, a pyrrolyl group which may be  
 substituted with Z, a furyl group which may be substituted  
 with Z, or a condensed heteroaryl group which may be  
 substituted with Z;

15 X<sup>2</sup> represents -NH-R<sup>77</sup>-NH- or -NH-R<sup>78</sup>-;

R<sup>77</sup> and R<sup>78</sup> independently represent a C<sub>1</sub>-C<sub>10</sub> alkylene  
 group, -C(O)CH<sub>2</sub>-, -CH<sub>2</sub>C(O)-, a divalent benzene ring which  
 may be substituted with Y, a divalent pyridine ring which may  
 be substituted with Y, a divalent biphenyl group which may be  
 20 substituted with Y, a divalent naphthalene ring which may be  
 substituted with Y, a divalent thiophene ring which may be  
 substituted with Y, a divalent pyrrole ring which may be  
 substituted with Y, a divalent furan ring which may be  
 substituted with Y, or a condensed hetero ring which may be  
 25 substituted with Y;

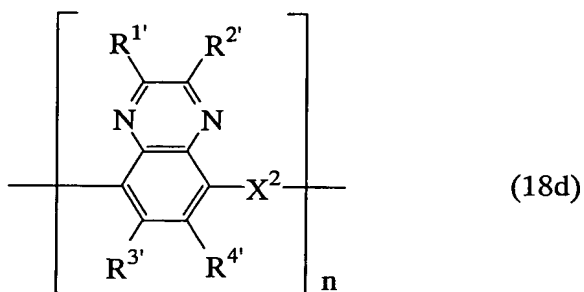
Y represents a halogen atom, a cyano group, a nitro  
 group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub>  
 alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a  
 C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be  
 30 substituted with Z, a pyridyl group which may be substituted  
 with Z, a biphenyl group which may be substituted with Z, a  
 naphthyl group which may be substituted with Z, a thienyl  
 group which may be substituted with Z, a pyrrolyl group which  
 may be substituted with Z, a furyl group which may be  
 35 substituted with Z or a condensed heteroaryl group which may  
 be substituted with Z provided that if Y is two or more in  
 number, Y may be the same or different;

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrolyl group, a furyl group or a condensed heteroaryl group, provided that when Z are two or more in number, Z may be the same or different; and

n is an integer of 2 or over.

24. A polyaminoquinoxaline compound having recurring units of the following formula (18d) obtained by polymerizing the monomer defined in claim 17,

[Chemical Formula 24].



wherein R<sup>1'</sup> and R<sup>2'</sup> join together to form -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>-, -OCH<sub>2</sub>O-, -CH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>SCH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>N(R')-, -N(R')CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>N(R')CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>O-, -SCH<sub>2</sub>CH<sub>2</sub>S-, -OCH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>O-, -CH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>-, -OCH=CH-, -CH=CHO-, -SCH=CH-, -CH=CHS-, -N(R')CH=CH-, -CH=CHN(R')-, -OCH=N-, -N=CHO-, -SCH=N-, -N=CHS-, -N(R')CH=N-, -N=CHN(R')-, -N(R')N=CH-, -CH=N(R')N-, -CH=CHCH=CH-, -OCH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>O-, -N=CHCH=CH-, -CH=CHCH=N-, -N=CHCH=N-, -N=CHN=CH-, or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a

biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z, and R<sup>3'</sup> and R<sup>4'</sup> join together to form

5 -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>-, -OCH<sub>2</sub>O-, -CH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>SCH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>N(R')-, -N(R')CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>N(R')CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>-,

10 -CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>O-, -SCH<sub>2</sub>CH<sub>2</sub>S-, -OCH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>O-, -CH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>-, -OCH=CH-, -CH=CHO-, -SCH=CH-, -CH=CHS-, -N(R')CH=CH-, -CH=CHN(R')-, -OCH=N-, -N=CHO-, -SCH=N-, -N=CHS-, -N(R')CH=N-, -N=CHN(R')-, -N(R')N=CH-, -CH=N(R')N-, -CH=CHCH=CH-, -OCH<sub>2</sub>CH=CH-,

15 -CH=CHCH<sub>2</sub>O-, -N=CHCH=CH-, -CH=CHCH=N-, -N=CHCH=N-, -N=CHN=CH-, or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be

20 substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be

25 substituted with Z or a condensed heteroaryl group which may be substituted with Z;

X<sup>2</sup> represents -NH-R<sup>77</sup>-NH- or -NH-R<sup>78</sup>-;

R<sup>77</sup> and R<sup>78</sup> independently represent a C<sub>1</sub>-C<sub>10</sub> alkylene group, -C(O)CH<sub>2</sub>-, -CH<sub>2</sub>C(O)-, a divalent benzene ring which

30 may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a divalent pyrrole ring which may be

35 substituted with Y, a divalent furan ring which may be substituted with Y or a condensed hetero ring which may be substituted with Y;

Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group, provided that when Z are two or more in number, Z may be the same or different; and

n is an integer of 2 or over.

25. A film obtained by use of an aminoquinoxaline compound or a polyaminoquinoxaline compound as defined in any one of claims 1 to 24.

26. The film according to claim 25, wherein the film is prepared by spin coating, casting or vacuum deposition.

27. The film according to claim 25, wherein the film is obtained by compression molding.

28. An electro chromic device made by use of an aminoquinoxaline compound or a polyaminoquinoxaline compound as defined in any one of claims 1 to 24.

29. A semiconductor device made by use of an aminoquinoxaline compound or a polyaminoquinoxaline compound as defined in any one of claims 1 to 24.
- 5 30. A p-type semiconductor obtained by oxidizing, with an oxidizing agent or through electrochemical doping, an aminoquinoxaline compound or a polyaminoquinoxaline compound as defined in any one of claims 1 to 24.
- 10 31. An n-type semiconductor obtained by reducing, with a reducing agent or through electrochemical doping, an aminoquinoxaline compound or a polyaminoquinoxaline compound as defined in any one of claims 1 to 24.
- 15 32. A solar cell made by use of the p-type semiconductor defined in claim 30 and the n-type semiconductor defined in claim 31.
- 20 33. An organic electroluminescent device made by use of an aminoquinoxaline compound or a polyaminoquinoxaline compound as defined in any one of claims 1 to 24.
- 25 34. A non-linear organic material made by use of an aminoquinoxaline compound or a polyaminoquinoxaline compound as defined in any one of claims 1 to 24.